

**REMARKS**

Claims 102-124, 126-131, and 133-139 are pending in the application with claims 102, 113, 114, 117-121, 129, and 130 amended herein, new claims 136-139 added herein, and claim 135 withdrawn. Applicant expresses appreciation for the careful consideration given prior arguments as evidenced by the detailed response to arguments in the Office Action. Applicant endeavors to bring the claims into condition for allowance with the amendments herein.

Claims 102-106, 108-113, 124, and 126-128 stand rejected under 35 U.S.C. 112, first paragraph, as lacking an enabling description in the specification.

Applicant requests reconsideration. Claim 102 is amended herein incorporating the entire subject matter of previous claim 114 (which claim was not rejected as

lacking enablement) and now possesses an enabling description in the specification. The remaining rejected claims depend from claim 102 and are thus

enabled as well. Applicant requests withdrawal of the lack of enablement rejection in the next Office Action.

Claims 104, 105, and 109 stand rejected under 35 U.S.C. 112, first paragraph, as lacking an enabling description in the specification. Applicant requests reconsideration.

Claim 104 depends from claim 102 and sets forth that blanket exposing includes employing the dry oxygen-comprising gaseous material to form the oxygen comprising plasma. The Office Action alleges that no support exists for using the same oxygen gas for forming the first layer and exposing the first layer to a plasma. The Office Action also alleges no support for exposing the first layer to a plasma formed

with a "dry" oxygen gas. Applicant notes that page 12, lines 15-21 of the present specification expressly describe using the same oxygen containing precursor for both deposition and plasma exposure in a PECVD chamber such as the chamber now set forth in amended claim 102 from which claim 104 depends. Also, at least page 7, lines 5-17 of the present specification list exemplary oxygen containing precursors for deposition and state that they may be "dry." It thus follows, that dry oxygen-comprising gaseous material may be used to form the oxygen comprising plasma for plasma exposure. Applicants request withdrawal of the claim 104 and 105 rejection in the next Office Action.

Claim 109 depends from claim 102 and sets forth that the oxygen comprising plasma is formed employing another oxygen-comprising gaseous material different from that used for deposition. The Office Action alleges that the specification does not support a requirement that the gaseous materials be different. However, Applicant asserts that it is irrelevant whether a requirement for different gases is disclosed since the specification clearly describes embodiments where the gases are, in fact, different. Claim 109 is thus fully disclosed and enabled. At least page 11, lines 18-20 list possible gaseous materials for plasma exposure and at least page 7, lines 5-17 list possible gaseous materials for deposition. As an example, one embodiment may use O<sub>3</sub> for plasma treatment and may use O<sub>2</sub>, N<sub>2</sub>O, CO, and/or CO<sub>2</sub>, among others different from O<sub>3</sub>, for deposition. A variety of other possible embodiments are expressly described where deposition gas and plasma exposure gas are different. Given such express description, it is not seen how claim 109 can possibly be considered to lack an

enabling disclosure. Applicants request withdrawal of the claim 109 rejection in the next Office Action.

Claims 102-124, 126-131, 133, and 134 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. Applicant requests reconsideration.

The Office Action alleges that "while generating plasma" in claims 102 and 129 is unclear. Applicant notes that claims 102 and 129 expressly set forth "chemically vapor depositing ... by introducing ... a gaseous material precursor and a dry oxygen-comprising material while generating a plasma." Also, claims 102 and 129 are amended herein to clarify that the plasma is generated "in the reaction chamber" and that the reaction chamber is for a "plasma enhanced" CVD apparatus. Claims 102 and 129 are thus definite.

The Office Action also alleges that claim 115 is indefinite for setting forth "at least some of the carbon atoms." With the amendment of claim 102, antecedent basis for "the carbon atoms" is now in claim 102 and the claim 115 scope is changed by its dependence from claim 102 such that claim 115 is no longer indefinite.

The Office Action further alleges that claim 120 is indefinite for setting forth an open-ended range. Claim 120 is amended herein to set forth a proper range supported at least by page 12, lines 2-3 of the present specification.

Applicant asserts that claims 102, 129, and the claims depending therefrom, including claims 115 and 120, are definite and request withdrawal of the indefiniteness rejection in the next Office Action.

Claims 102-110, 112-124, 126-131, 133, and 134 stand rejected under 35

U.S.C. 103(a) as being unpatentable over Yau in view of Morita. Applicant requests reconsideration.

Amended claim 102 sets forth a method that includes, among other features, depositing a first layer, the first layer having a first dielectric constant and having silicon atoms bonded to carbon atoms, and blanket exposing the first layer to an oxygen comprising plasma. The plasma is effective to form a low dielectric constant insulative layer from the first layer, effective to reduce the first dielectric constant to a second dielectric constant, effective to allow a base chemistry of the whole deposited first layer to remain substantially without transformation to another base chemistry after the blanket exposing, and ineffective to appreciably etch the first layer. Amended claim 102 thus incorporates the entire subject matter of previous claims 113 and 114. The added term regarding allowing a base chemistry of the whole deposited first layer to remain substantially without transformation is supported at least by page 12, lines 3-9 of the present specification. Applicant asserts that the record evidences agreement by the Office that the specification enables the added term as memorialized in an Interview Summary filed October 3, 2001 by the Applicant.

Pages 5-7 of the Office Action allege that Yau discloses every element of previous claim 102 with the exception of blanket exposing the first layer to an oxygen comprising plasma. The Office Action relies upon Morita as allegedly disclosing the claimed subject matter. However, review of Yau and Morita reveals that neither reference discloses or suggests blanket exposing with a plasma effective to allow a base chemistry of the whole deposited first layer to remain

substantially without transformation to another base chemistry after the blanket exposing converts the first layer to the insulative layer.

Page 6 of the Office Action refers to Morita in acknowledging that such reference describes removing the organic functional groups of an organic silicon thin film 10 and transforming the film into a silicon oxide film 11. In its thinnest portions, organic silicon thin film 10 transforms nearly entirely to silicon oxide film 11. In the thickest portions, some of organic silicon thin film 10 remains beneath a portion transformed to silicon oxide film 11. Applicant asserts that transformation from organic silicon thin film 10 to silicon oxide film 11 constitutes transformation from one base chemistry to another base chemistry. Amended claim 102 sets forth that the plasma blanket exposure is effective to allow a base chemistry of the whole deposited first layer to remain substantially without transformation to another base chemistry. At least for such reason, Morita does not disclose or even suggest every limitation of amended claim 102.

As acknowledged in the Office Action on page 6, a specific objective of Morita is to transform at least a part of organic silicon thin film 10 to silicon oxide film 11. Any modification to Morita that would prevent transformation of a part of organic silicon thin film 10 to another base chemistry would necessarily frustrate the Morita objective of removing organic functional groups of organic silicon thin film 10 while still providing an underlying organic silicon material. Modification of Morita or of the combination of Yau and Morita to provide the claimed plasma blanket exposing that retains the whole deposited first layer base chemistry without transformation would frustrate an intended purpose of Morita.

The mere fact that the prior art can be modified does not make the modification obvious "unless the prior art suggested the desirability of the modification." In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Accordingly, if a proposed modification of the prior art would render the prior art device or process "inoperable for its intended purpose," then no suggestion or motivation exists to make the proposed modification. Id.; MPEP § 2143.01. At least for the reasons indicated herein, Applicant asserts that no suggestion or motivation exists to modify Morita or Yau to produce the method of amended claim 102. Accordingly, Yau in view of Morita fails to disclose or suggest every element of amended claim 102 and such claim is patentable over the cited combination.

Claims 103-110, 112-124, 126-128, and 136 depend from claim 102 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, amended claim 113 sets forth

that the blanket exposing occurs at a RF power range of from 300 to 1000 Watts, a pressure range of from 1 to 6 Torr, and a temperature range of from 100 to 450°

C. Yau and Morita do not disclose or suggest a RF power range, a pressure range, or a temperature range for exposure with the Morita oxygen plasma. Also for example, claim 114 sets forth that the blanket exposing occurs between plates of a dual plate capacitively coupled reactor at a plate spacing of from 400 to 600 mils. Yau and Morita do not disclose or suggest plate spacing for the Morita oxygen plasma. The subject matter of amended claims 113 and 114 is supported at least by page 11, line 20 to page 12, line 3 of the present specification. As known to those of ordinary skill, the parameters set forth in amended claims 113

and 114 for blanket exposing assist in providing a plasma that is effective to accomplish the claimed method limitations.

In addition, amended claims 117-121 set forth criteria regarding the whole deposited first layer remaining substantially without transformation to another base chemistry. Neither Yau nor Morita disclose or suggest the limitations of claims 117-121. Further, claims 120 and 136 set forth blanket exposing for from 20 seconds to 100 seconds. In contrast, the only exposure time in Morita is 10 minutes (600 seconds) which is much greater than the maximum exposure time set forth in claims 120 and 136. Clearly, Morita does not contemplate a plasma blanket exposure such as set forth in claims 120 and 136 that is effective to allow a base chemistry of the whole deposited first layer to remain substantially without transformation to another base chemistry.

Amended claim 129 sets forth a method that includes, among other features, depositing a first layer, the first layer having a first dielectric constant, and blanket exposing the first layer to an oxygen comprising plasma. The plasma is effective to form an insulative layer from the first layer, effective to reduce the first dielectric constant to a second dielectric constant for the insulative layer, and ineffective to appreciably etch the first layer. The second dielectric constant is in a range of about 2.5 to 2.0 and the whole insulative layer comprises  $(\text{CH}_3)_x\text{SiO}_y$ . Page 6 of the Office Action alleges that a teaching in Morita of  $\text{R}_n\text{Si}(\text{OH})_{4-n}$ , wherein R is any alkyl group, discloses the claimed composition for the insulative layer. However, Applicant notes that substitution of R with methyl yields the compound  $(\text{CH}_3)_n\text{Si}(\text{OH})_{4-n}$  which is not among any of the compounds defined by

the formula  $(\text{CH}_3)_x\text{SiO}_y$  in claim 29. Accordingly, Morita fails to disclose or suggest every claim limitation.

In addition, amended claim 129 sets forth that the blanket exposing is effective to form the insulative layer from the first layer and the whole insulative layer includes  $(\text{CH}_3)_x\text{SiO}_y$ . In contrast, page 6 of the Office Action acknowledges that Morita teaches exposing organic silicon thin film 10 to oxygen plasma to transform at least a portion to silicon oxide film 11. Even though organic silicon thin film 10 and silicon oxide film 11 are insulative, Morita does not disclose or suggest the whole insulative layer containing an organic silicon compound as set forth in claim 129. At least for such additional reason Morita fails to disclose or suggest every limitation of claim 129.

The Office Action relies upon Morita to remedy certain deficiencies of Yau. However, in view of Applicant's assertions herein, both references are deficient in the same respect in disclosing or suggesting every element of claim 129. At least for such reason, claim 129 is patentable over Yau in view of Morita.

Claims 130, 131, 133, 134, and 137-139 depend from claim 129 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, as may be appreciated from the discussion above regarding the deficiencies of Yau in view of Morita as applied to claims 113, 114, and 136, Applicant asserts that respective claims 137-139 are also patentable.



As established herein, claims 102-110, 112-124, 126-131, 133, 134, and 136-139 are patentable. Applicant requests allowance of such claims in the next Office Action.

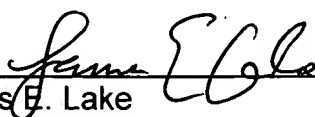
Claim 111 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Yau in view of Morita and further in view of Miyasaka. Applicant requests reconsideration. Claim 111 depends from claim 102 the subject matter of which is described above. However, Miyasaka does not remedy the deficiencies of Yau in view of Morita as applied to claim 102. Accordingly, claim 111 is patentable at least for its dependence from claim 102 as well as for any additional limitations not disclosed or suggested. Applicant requests allowance of claim 111 in the next Office Action.

Applicant asserts adequate reasons in support of patentability are set forth herein with regard to claims 102-124, 126-131, 133, 134, and 136-139. Applicant requests allowance of all such pending claims in the next Office Action.

Applicant previously filed a Supplement IDS and Form PTO-1449 citing references on May 22, 2003. The Office returned a postcard indicating that the IDS was received. However, a copy of the Form PTO-1449 with Examiner initials indicating consideration of the cited references was not received with the Office Action. Applicant requests a copy of the initialed Form with the next Office Action.

Respectfully submitted,

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